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Exploring the Usefulness of School Education about Risks on Social Network Sites: A Survey Study

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Abstract
The growing popularity of social network sites (SNS) is causing concerns about privacy and security, especially with teenagers, since they show various forms of unsafe behavior on SNS. It has been put forth by researchers, teachers, parents, and teenagers that school is ideally placed to educate teens about risks on SNS and to teach youngsters how to use SNS safely. Privacy attitudes also need to be taken into account if we want to decrease the amount of unsafe behavior. However, there is a lack of research that focuses on the role and impact of school education on privacy attitudes or actual safe behavior on SNS. To counter this shortcoming, a survey study was set up with 638 pupils exploring teenagers' attitudes towards privacy on SNS. The first question was: Do they care about their privacy? Next to that, the extent to which they show unsafe behavior on SNS was questioned. Finally, the impact that school education has on both privacy care and the safety of teenagers' behavior on SNS was studied. It was found that teenagers do not care much for their privacy, and that a lack of privacy care leads to unsafe behavior on SNS. However, school education has a positive impact on privacy care, and by raising privacy care it also has an indirect positive impact on the safety of pupils' behavior. Our results suggest, therefore, that more efforts for school education about safer use of SNS are important, especially since the attention for the topic in schools is still found to be extremely limited and not organized in the curriculum. Practical implications are discussed.

Keywords: social network site, privacy, unsafe Internet use, secondary education, behavioral change

Introduction

We are witnessing the rapid growth of a new generation of participatory and collaborative network technologies that provide individuals with a platform for sophisticated online social interaction. Social network sites (SNS) today have hundreds of millions of users and are transforming our social and professional interactions. According to a recent study, 73% of European thirteen- to fourteen-year-olds and 82% of European fifteen- to sixteen-year-olds have a profile on a SNS containing personal information (Livingstone et al. 2011). This causes a growing concern about security and privacy issues in social networks, particularly with teenagers (DeMoor et al. 2008; Hogben 2007).

Unsafe Behavior on SNS

Although a clear distinction should be made between the risks teenagers face and the harm they experience (Livingstone et al. 2011), research has indicated that at least some behaviors on SNS, such as providing personal information, are associated with negative experiences (Mcgivern and Noret 2011). In literature, different behaviors of teenagers on SNS are therefore described as unsafe. Most frequently there is a focus on posting *risky information* on profiles, which has been defined as personal information allowing the viewer of the profile to identify and contact the profile owner (Livingstone et al. 2011). Lenhart and Madden (2007) found in their survey research that American teens put a variety of information on their profiles, but the most common items are their first names (82%) and pictures of themselves (79%). In addition, 66% include pictures of friends, 61% include the name of their cities or towns, and 29% post their last names and include videos. Paulussen et al. (2010) found comparable results in Belgium, except the fact that they found a higher amount of posted videos (37%) and last names (46%). Possible unintended consequences of revealing this kind

of information include damaged reputation, rumors and gossip, cyberbullying, harassment or stalking, use of personal data by third parties like advertisers, hacking, identity-theft, or the use of the information by superiors like teachers or potential employers (Debatin et al. 2009).

Next to posting a vast amount of personal information on their SNS-profile, some teenagers also show other *risky behaviors*, as have been described in previous research, such as password sharing (Lenhart et al. 2010; Sharples et al. 2009), accepting strangers as friends on a SNS (thereby often allowing these strangers full access to their profiles and personal information) (Debatin et al. 2009; Mcgivern and Noret 2011), not reading the privacy policy (Jones and Soltren 2005; Marwick, Murgia-Diaz, and Palfrey 2010), or not using their privacy settings (Debatin et al. 2009; Livingstone et al. 2011). Moreover, since it is found that users post a significant number of pictures of other people on their profiles, for example of friends and family (Hum et al. 2011; Nosko, Wood, and Molema 2010), it might be questioned if permission had been obtained to post these images. Otherwise, the right of image (e.g., in European countries like Belgium, Germany, and Netherlands; Dierickx 2005) or the privacy rights (e.g., in the United States) of the person depicted might be invaded.

All these risks are alarming, since research indicates that exposure to online risks causes harm and negative experiences in a significant amount of cases (Livingstone et al. 2011; Mcgivern and Noret 2011). Furthermore, some theories predict that young teens are more impatient, and have difficulties resisting social and emotional influences while remaining focused on the long-term risks and future consequences of their decisions (Albert and Steinberg 2011; Lewis 1981). Additionally, it was found that they have a harder time controlling their impulses and have higher thrill-seeking and disinhibition scores than adults (Cauffman and Steinberg 2000). This could increase risk-taking by teens (Gruber 2001), especially since SNS are used to construct an online identity (Madden and Smith 2010; Zhao et al. 2008). While posting personal or revealing pictures and interests helps in building one's identity (Hum et al. 2011), it might also jeopardize teenagers' privacy. The process of personal and social identity construction has always existed with teenagers, but a SNS gives it a new dimension. The profile pages used to build an identity are often available for more people than just the peers they were built for, thereby complicating the process of privacy protection.

Most research that reports on individual differences in risky behavior with regard to age or gender focuses on the type and the amount of information that young people post on their SNS, and the way they change their privacy settings. Lenhart and Madden (2007) found that older teenagers (fifteen to seventeen years old) tend to post more pictures and other personal information on their profiles, but they are not more likely to adopt more stringent privacy settings (Livingstone et al. 2011). It has also been found that girls post more pictures, while boys give more contact information (Lenhart and Madden 2007). Peluchette and Karl (2008) also found in an American survey study that boys shared significantly more self-promoting and risky pictures or comments (involving sex or alcohol), while girls were more likely to post romantic or endearing pictures and information. Moreover, girls reported more often than boys that they had changed their privacy settings (Lewis, Kaufman, and Christakis 2008; Livingstone et al. 2011). These findings are in line with an evolutionary theory that states that due to sexual selection pressure, men are prone to be more risk-taking while women are more cautious (Schmitt et al. 2008).

Additionally, it was found that boys and girls are equally unfamiliar with SNS privacy policies (Jones and Soltren 2005). With regard to the other risky behaviors that are regularly described in literature (cf. supra), no studies about individual differences with regard to age or gender could be found. Also, only a limited number of studies could be found that investigated differences related to users being enrolled in different education forms (vocational, technical, or general education). Vandoninck et al. (2011) found that there are no differences in sharing general descriptive information, but pupils enrolled in vocational education and technical education share more contact information than those enrolled in general education. To counter the gaps in literature, a survey study was set up to investigate the amount of unsafe behavior with teenagers and individual differences that can be found with regard to age, gender, and education form.

Privacy Care

Since it has been found that risky behaviors are related to negative experiences (Mcgivern and Noret 2011), it would be desirable to decrease the amount of these behaviors. Therefore, it is important to take into account the antecedents of risky behavior. Different theories predict that attitudes precede

behavior. The transtheoretical model of behavior change (Prochaska, DiClemente, and Norcross 1992) states that a contemplation phase, in which the problem is recognized, precedes the preparation phase and action phase, in which behavior is changed. The same prediction comes forth out of the theory of planned behavior (Ajzen 1991), which states that attitudinal beliefs, together with subjective norms and perceived behavioral control, predict behavioral intentions and so behavior change. Meta-analytic reviews show that both theories have been confirmed in many empirical studies (Armitage and Conner 2001; Prochaska et al. 1994).

With regard to unsafe behavior on SNS, we might therefore state that teenagers' attitudes towards their privacy are important, that is that teenagers recognize the problem and care about their privacy in the first place. Mark Zuckerberg, founder of the currently most popular SNS Facebook (Hampton et al. 2011), stated that they do not care, but this has been criticized (Kirkpatrick 2010). Empirical research obtains mixed results. Depending on the exact measure of privacy care, the age of the respondents, and other methodological differences, some studies found that teenagers care about their privacy, while others found the opposite. Boyd and Hargittai (2010) found, for example, that although young people post various types of content on their Facebook profiles, most teenagers reported to have changed their privacy settings at least to some extent. They conclude that young people are not indifferent about their privacy.

However, other studies pointed out that a lot of adolescents do not change their privacy settings. Debatin et al. (2009) found that still 31% of their respondents did not change their privacy settings. This is in line with Livingstone et al. (2011), who found in their survey study that 29% of European teenagers sustain a public profile or do not know about their privacy settings. Moreover, 28% opt for partially private settings so that, at most, friends-of-friends can see their pages. While friends-of-friends may give the illusion of closeness, these people are, nevertheless, mostly strangers. However, this lack of strict and effective use of privacy settings does not necessarily mean that young people do not care about their privacy. That is, this unsafe behavior might, for example, be caused by a lack of technical knowledge, peer pressure, or the unawareness of the true visibility of their profiles. It might be hypothesized that the relationship between privacy care and the use of privacy settings, or any other (un)safe behavior on SNS, is more complex. Only a direct measure of privacy care and unsafe behavior would therefore be able to point out whether teenagers care about their privacy and what influence this has on their behavior. The empirical research using self-reported measures of privacy care shows moderate to low levels of online privacy care (e.g., Acquisti and Gross 2006; Dinev and Hart 2004; Fogel and Nehmad 2009). It was also found that boys care even less about their privacy compared to girls (Fogel and Nehmad 2009; Hoy and Milne 2010). Again, this can be explained by evolutionary theories, stating that girls have developed to be more cautious (Schmitt et al. 2008). Moreover, they consistently score higher on the personality trait neuroticism, indicating more negative feelings such as fear and concern (Chapman et al. 2007).

No studies could be found that focused on age differences between teenagers or differences between teenagers enrolled in a different education form. Therefore, in our survey research, we investigated if low levels of privacy care could be confirmed, and if there were any individual differences with regard to age, gender, and education form.

Furthermore, empirical research studying the relationship between privacy care and behavior on SNS obtains mixed results. Milne and Culnan (2004) found in an online survey study that privacy concern is positively related to the reasons to read online privacy policies. Utz and Kramer (2009) also found that more privacy care predicts more restrictive privacy settings. However, Dwyer, Hiltz, and Passerini (2007) conducted three survey studies and found that privacy concern only relates to information sharing for one of their items: their instant messenger screen names. Acquisti and Gross (2006) found in this respect that there was little or no relationship between participants' reported privacy attitudes and their likelihood of providing certain information. Brown and Muchira (2004) also found mixed results in their survey study about the relationship between online privacy attitudes and behavior. While all these studies take into account one particular aspect of unsafe behavior, which might explain the differences in findings, it might be interesting to study the impact of privacy care on different forms of unsafe behavior. In the end, it is important that teenagers behave safely with respect to all these different aspects. Therefore, in our survey research we also investigated the impact of privacy care on unsafe behavior on SNS in general.

School Education

To obtain safer behavior with teenagers, many

authors emphasized the role of school to educate teens about online risks (Livingstone and Haddon 2009; Marwick, Murgia-Diaz, and Palfrey 2010; Patchin and Hinduja 2010). Also, parents and young people report that they consider school as an important place to receive online safety information (Safer Internet Programme 2009). Online safety has been formally included in school curricula in many European countries (Safer Internet Programme 2009), as part of a broader media literacy program. Media literacy has been defined by Livingstone (2003) as "the ability to access, analyze, evaluate and create messages across a variety of contexts" (3). As Livingstone (2004) already mentioned, teens are better at accessing and finding information online than they are at avoiding risks posed to them by the Internet. Therefore, school education might still be important.

However, it has been found that the implementation of the topic of online safety is inconsistent (Safer Internet Programme 2009). Previous survey studies with teachers in England indicate that 42% of the teachers never lecture about online safety, and only 11% reported to do so frequently. The same survey research also points out that SNS are often blocked in schools. While claiming to take responsibility by preventing teenagers to face risks on SNS during school time, schools fail this way to teach children essential skills of managing their online identity. Blocking SNS in schools often even encourages teenagers to subvert filters or restrictions (Sharples et al. 2009).

Additionally, despite the fact that a variety of educational packages about safety and security in SNS have been developed (for an overview, see Insafe 2012), there has not been any research on whether schools use these packages, and none of them have been empirically evaluated (Safer Internet Programme 2009; Vanderhoven, Schellens, and Valcke 2011). There is a lack of consistent evaluation of any educational efforts in this field, while the impact of education in online security problems is hotly debated. Although positive effects have been found in some domains of Internet security (Kumaraguru et al. 2010; Moreno et al. 2009), other studies show that (primary) school-based measures do not influence the online safety of children (Valcke, Schellens, Van Keer, et al. 2007). In media literacy research, the few quantitative intervention studies in classroom settings typically find that media literacy education increases knowledge about the specific topic of the course (Martens 2010). However, while media literacy programs often aim to change attitudes and behavior, on top of a gain in knowledge, attitudes and behavior are commonly not measured. The few empirical studies about media literacy education that did take into account these measures indicate that attitudinal and behavioral changes are much harder to obtain (Cantor and Wilson 2003). Indeed, most of this research does not find any impact on attitudes or behavior (Duran et al. 2008; Steinke et al. 2007).

Since, as stated earlier, privacy care might be a precedent of (un)safe behavior, it is interesting to verify the impact on attitudes as well. To counter these shortcomings, in the survey study that was set up, the impact of efforts that have been done by secondary schools to raise the awareness on safe use of SNS both on privacy care and on the behavior of their pupils was determined.

Research Questions

A survey research was conducted to study privacy care by teenagers, their (un)safe behavior on SNS, and the impact of school education. Thereby, the following research questions were put forward:

(1) Do teenagers care about privacy on SNS in general, and are there any individual differences with regard to gender, age and education form?

(2) Do teenagers show unsafe behavior on SNS in general, and are there any individual differences with regard to gender, age and education form?

(3) Does raising awareness in school education have a positive impact on privacy care and/or the safety of teenagers' behavior on SNS?

Survey Study

Participants

In total, forty-eight classes out of twenty-six schools in Flanders (Belgium) were randomly selected. This way, the survey was distributed among 638 pupils between fourteen and nineteen years old (mean age = 16.75), with 26% boys and 74% girls. In all, 25% were enrolled in technical education (TSO), 16% in vocational education (BSO), and 59% were enrolled in general education (ASO). Four percent of the students had no profile on a social network. These students were excluded from further analyses. Of the remaining participants, 97% had a Facebook profile and 34% had a profile on a Belgian SNS called Netlog. Those who had a Facebook profile indicated to use this more than other profiles they had.

Measures

To answer the different research questions, different constructs were measured. Next to age and education form (vocational, technical, or general education), it was asked whether these teens have a social network profile and which one they used most.

In addition, we measured the teenagers' care about privacy on SNS (*privacy care*) using an adapted scale of Acquisti and Gross (2006) consisting of six items on a 7-point Likert scale (for example, "Are you concerned about the kind of personal information you are revealing to others through Facebook/Netlog/…" and, "Are you concerned about who can access the information you publish through Facebook/Netlog?" (1 = not concerned, 7 = very concerned)). The internal consistency of this scale was satisfactory, Cronbach's $\alpha = .88$. Moreover, in accordance with Valcke et al. (2011), an *unsafe behavior-index* was calculated based on the number of people with whom they share their password, the amount of personal information they put on their profile page, the amount of pictures of other people they posted online (without asking), the extent to which they have accepted strangers to be their friends, whether they have read the privacy policy of the social network, and the extent to which they have changed their privacy settings (negatively scored). The index gives an indication of how safely the pupil acts on SNS. The index has a minimum score of 0 (very safe behavior) and a maximum score of 6 (very unsafe behavior).

We also measured the attention the school devotes to the topic (*school attention*). This scale consisted of five items on a 7-point Likert scale. The questions used were, for example, "Has anyone in school ever told you about privacy on social network sites," and, "Have you ever had any lessons/projects at school about privacy on social network sites?" (Cronbach's $\alpha = .71$).

Results

RQ 1: Do teenagers care about privacy on SNS? The mean score on the direct measure of privacy care was lower than the neutral 4 on a 7-point Likert scale ($M = 3.67$, $SD = 1.31$). Therefore we might conclude that, in general, pupils do not care much about their privacy. To find out variations between teenagers, we checked for differences regarding age, gender, and education form. An ANCOVA (analysis of covariance) was performed, with privacy care as a dependent variable, gender and education form as a fixed factor, and age as a covariate. The results of this analysis can be found in table 1. It was found that girls care more for their privacy than boys. Moreover, the older the teenagers are, the more they care about their privacy. No differences were found with regard to their education form.

RQ 2: Do teenagers show unsafe behavior on SNS? The general mean score on the unsafe behavior-index is 2.89 on a 6-point scale ($SD = 0.98$). This is not very high, but it is not negligible. Again, an ANCOVA was performed to find variations between teenagers of different age, education form, and gender. Results of this analysis are shown in table 1. It was found that older teenagers show less unsafe behavior on SNS than younger teenagers. No differences were found with regard to gender or education form.

To find out if there is a direct impact of privacy care on the amount of unsafe behavior, as is predicted by several theories (cf. section Unsafe Behavior on SNS), privacy care was added to the model as a covariate. It was found that teenagers who care more for their privacy show less unsafe behavior ($F(1,555) = 54.51$, $p < .001$).

Table 1. Results of the ANCOVA-analysis on privacy care and unsafe behavior

	Gender			Age		Education form			
	Boys	Girls	F(df1, df2)	B	F(df1, df2)	ASO	BSO	TSO	F(df1, df2)
Privacy Care	3.38 (1.44)	3.78 (1.25)	$F(1,590) = 4.78$*	.09	$F(1,590) = 4.94$*	3.64 (1.26)	3.66 (1.41)	3.75 (1.37)	$F(2,590) = .16$
Unsafe Behavior	2.92 (1.06)	2.88 (.95)	$F(1,562) = 2.55$	-.09	$F(1,562) = 8.18$*	2.96 (.92)	2.63 (1.18)	2.87 (.97)	$F(2,562) = .00$

Note: Means are given for all categories; standard deviation is given between brackets.

* indicates significant differences ($p < .05$).

RQ 3: Does raising awareness in school education have a positive impact on privacy care and/or the safety of teenagers' behavior on SNS? To find an answer to the third research question, we first checked the current situation with regard to school education. The mean score on *school attention*, the scale that measures the amount of attention spent on privacy issues on SNS, is 2.45 (SD = 1.40), which is rather low. Moreover, 98.7% of pupils reported never to have heard of any package about the topic. Some students stated: "The teacher is telling about it sometimes," or, "I've heard of it once in school," indicating occasional, disorganized attention.

Secondly, a regression analysis was conducted, to find out if school education has an impact on privacy care. It was found that the amount of school attention is a significant predictor of the amount of privacy care: the more attention they give to the topic in school, the more their pupils care about online privacy ($\beta = .15$, $t(582) = 3.76$, $p < .001$). However, it was found that there was no direct impact of school education on the unsafe behavior index ($\beta = -.05$, $t(554) = -1.24$, $p > .05$).

Still, the finding that school attention has a positive impact on privacy care, combined with the finding that privacy care has a positive influence on teenagers' safe SNS behavior (cf. RQ 2) shows an indirect effect of school attention on unsafe behavior through privacy care (see figure 1). The significance of this indirect effect can be verified with a bootstrapping method[1] (Hayes 2009). The indirect effect of school attention on unsafe behavior through privacy care is found to be significantly different from zero, by a 95% bias-corrected bootstrap confidence interval based on five thousand bootstrap samples (-.058 to -.015, with a point estimate of -.034). These results are consistent with the claim that attention in schools for the topic of privacy and security on SNS increases privacy care, which in turn lowers unsafe behavior.

Conclusion and Discussion

In agreement with previous research (e.g., Acquisti and Gross 2006), rather low levels for privacy care on SNS were found. Especially younger teenagers and boys are not concerned about privacy issues on SNS. As could be expected out of the transtheoretical model of behavior change (Prochaska, DiClemente, and Norcross 1992) and the theory of planned behavior (Ajzen 1991), it was found that this care about privacy has a significant influence on the safety of the behavior of these teenagers online. Most teenagers, younger teenagers in particular, show a non-negligible amount of unsafe behavior on SNS. The differences between pupils of a different gender (that could be found in previous literature) were not found in this research. Moreover, it is often found that older teenagers post more (risky) information (Lenhart and Madden 2007), which seems to contradict our finding that younger kids show more unsafe behavior. Both results can possibly be explained by the calculation of the unsafe behavior index, which included different forms of unsafe behavior, rather than focusing on only one form, such as posting information.

Our findings with regard to privacy care and unsafe behavior on SNS seem to indicate that raising the awareness and the care about privacy with teens might be helpful. As mentioned above, schools are ideally placed to organize these types of campaigns and lessons. While previous media literacy research finds

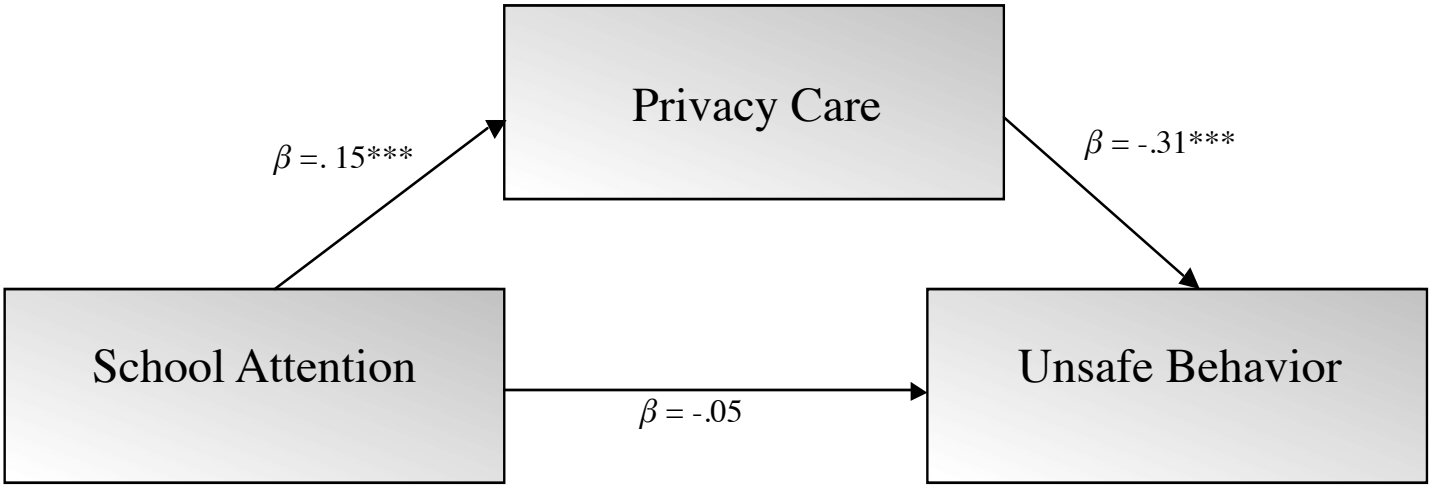

Figure 1. Representation of the direct and indirect effect of school attention on unsafe behavior.
*** indicates significance ($p < .001$).

limited or no effects of education on the safety of online attitudes and behavior (Martens 2010; Valcke et al. 2007), it was found in our study that school education has a positive impact on privacy care, and through privacy care on the students' behavior on SNS. Yet, it was also found that there is little attention in schools for raising the awareness about privacy and security issues on SNS. Moreover, if there is somehow attention given to the topic, it is not integrated in the curriculum or in a course, but rather incidental. This means that schools are not making much effort with regard to the problem of unsafe social network behavior in general. These findings are in line with previous indications out of focus groups (Safer Internet Programme 2009) and surveys with teachers (Sharples et al. 2009) and show no tendencies of improvement. Therefore, extra efforts need to be made for dissemination of educational materials. Further research is also needed as to know why packages are not used, for example by exploring the needs and preferences of teachers.

Our results also suggest that education about this topic would be most appropriate in classes with young teenagers, as they show most unsafe behavior. Taking into account the minimum age of most SNS, and the recommendations of Safer Internet Programme (2009), education would be most appropriate between the ages of thirteen and fourteen years old. There were, however, no differences between pupils enrolled in different education forms. Since the mean score on the unsafe behavior-index is non-negligible, education seems appropriate in all kinds of education forms.

However, a few pitfalls should be avoided while interpreting these results and their implications. First of all—although our results about the effects of education seem promising, indicating that encouraging schools to make an effort might be worthwhile—caution is recommended with regard to the thin line between increasing privacy care and inducing fear. Empirical research of different forms of prevention campaigns has shown that fear induction is a counterproductive strategy to prevent unsafe behavior (Luna and Finkelhor 1998). It is therefore necessary to emphasize positive aspects of SNS, while informing teenagers about the possible risks. Indeed, recent theories about media literacy education emphasize a skills-based approach (access, analyze, evaluate, and create messages), since children's online skills have a direct influence on their online opportunities and risks (Livingstone, Bober, and Helsper 2005). This way, teenagers can make informed decisions, without avoiding the opportunities SNS can offer (Raacke and Bonds-Raacke 2008).

Second, the theory of planned behavior (Ajzen 1991) predicts that next to attitudes, the opinion of significant others (which they call *social norm*) also has an important impact on one's behavior. Next to the teacher, who has been considered in our research, parents and peers are also important others in the life of adolescents. Considering the opportunities SNS offer when sharing information with peers, risky behavior might be socially desirable. Therefore, peers might negatively influence attitudes and prevent behavioral change. On the other hand, it has been found that parents might have a positive influence on children's attitudes and behavior (Kirwil 2009; Moscardelli and Liston-Heyes 2011). Further research should point out the optimal way to combine all these impacts to ensure safer behavior on SNS of teenagers.

Third, the results of this study with regard to the effectiveness of school attention on the topic of safe use of SNS need to be interpreted with caution, since the amount of given attention to the topic of safe use of SNS in schools is low. This might also explain why no direct effect of school attention on pupils' behavior could be found. A more direct measure of the effectiveness of educational packages on this topic can bring more insight in the effects on the attitudes, knowledge, and behavior of teenagers. Therefore, intervention studies in authentic classrooms are needed.

To conclude, it can be summarized that awareness raising educational packages for young pupils in all types of education forms are appropriate. Schools should be encouraged to pay attention to the problem of privacy and social networks, since raising the awareness and privacy care might lead to safer online behavior. More research is needed to be certain about the effectiveness of education on the topic of safe use of SNS and to define the criteria that are important for teachers to use educational materials on the topic.

Notes

1. Bootstrapping generates an empirical representation of the sampling distribution of the indirect effect. The obtained sample ($n = 611$) is seen as a mini-version of the population, and is used to resample 5,000 different bootstrap-samples ($n = 611$), sampled with replacement to allow a person to be drawn more than once in the newly created sample. The indirect effect is estimated for all of these generated samples, thereby constructing an empirical approximation of the sampling distribution of the indirect effect when taking a sample of 611 from the original population. Confidence intervals are based on this distribution.

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